CITY OF DUBLIN

Community Development Department
Building & Safety Division
100 Civic Plaza, Dublin, CA 94568 • Ph: (925) 833-6620 • www.dublin.ca.gov

# Residential Photovoltaic Systems

## Plan Submittal Checklist: Ground • Roof Mounted

### Purpose

This handout summarizes the requirements for a complete plan review submittal for residential ground or roof mounted photovoltaic (PV) system. Provided that all the code regulations and plan criteria are met, the review and permit may be issued over-the-counter. Ground- mounted PV systems will require a normal plan review submittal. The following guideline shall be reviewed before commencing any work.

### Additional Agency Approvals

#### Planning

If installing a ground-mounted PV system please contact the **Planning Division** at **(925) 833-6610** to ensure zoning regulations are met.

#### PG & E

Contact **PG &E's** Solar Customer Service line at **(877) 743-4112** to verify the agency's requirements.

### Plan Submittal for Construction

#### Quantity

Complete plans and documents must be submitted directly to the Building & Safety Division counter between 8:00 am to 4:00 pm, Monday through Friday.

- ❑ Three (3) complete sets of plans - At least two sets must be signed by designer or stamped and wet-signed by licensed professional
- ❑ Two (2) sets of structural calculations (if applicable) prepared, stamped and wet-signed by a California design professional
- ❑ Complete permit application
- ❑ Permit fee payment

### Minimum Plan Requirements

#### Size

Plans must be drawn to scale, fully dimensioned and legible on minimum 11 x 17 inch paper (e.g., site plan: 1/8-in = 1-ft) in a concise, detailed and professional manner.

#### Cover Sheet and/or Site Plan

- ❑ Job address; name and address of owner, contractor and contact person; address, phone number, title and registration of designer or design professional; description of work; applicable codes; sheet index.
- ❑ Site plan identifying lot and major components on the property; PV arrays on roof plan clearly showing minimum access pathways at all PV locations and roof access points; property lines.

#### Architectural / Electrical / Foundation Plans

- ❑ Dimensioned roof plan identifying existing roof framing (trusses or rafters); spacing and size; access, pathways and spacing requirements per CRC R331.4.
- ❑ Identify type and number of roof coverings and subsequent weatherproofing of the roof; plumbing and mechanical vents.
- ❑ Product data for solar panels and racking system; product weight; support locations and attachment.
- ❑ Framing plan and details for any work necessary to strengthen the existing roof structure.
  ***Note**: Structural calculations shall be required if the total weight of the photovoltaic system is over five pounds per square foot.*
- ❑ Electrical single-line diagram identifying all devices installed in the PV system and total kVA rating of system; point of interconnection with the utility supplied wiring system; details of main breaker; PV breaker and rating of bussing; type and size of all conduit and conductors throughout the PV system; overcurrent protection; inverter; disconnects; signage; AC connection to building; grounding and bonding of rails and modules.
- ❑ Manufacturer's cut-sheets and installation instructions for all manufactured components: PV modules, inverters, combiner box (if used), disconnects, mounting system with base and rail attachment and connections.
- ❑ Ground-mounted PV system: Complete foundation plan; footing detail references; connection details for solar water heater system.

## Plan Check Time / Permit Issuance

Provided all the information is complete, roof-mounted solar permit applications are typically reviewed the same day and may be issued over-the-counter. One set of approved plans will be returned to the applicant to be maintained at the job site until the final inspection has been made. The Building & Safety Division will keep a set on file until 90 days after construction has been completed. The third set will be forwarded to the County's Assessor's Office.

## Inspection Guidelines

### General

- ✓ Customer / installer shall provide approved plans on site for inspector.
- ✓ Photovoltaic module number and location of installation must match approved site plan.

  *Note: Revisions to the PV panel layout shall be submitted to the Building & Safety counter for review prior to final inspection. Additional fees may be charged.*
- ✓ Customer / installer shall provide access to all areas needed for inspection.
- ✓ Roof mounted panels: Installer shall provide a proper and **secured ladder(s)** to access all areas.
- ✓ In house: If wiring in attic and/or garage area, the customer / installer shall ensure access to attic and / or garage.

### Roof Access and Pathways

- ✓ Verify minimum 3-ft clearance from arrays to ridge and edge of roof. (2013 CRC R331.4)
- ✓ Verify all structural supports are properly installed and sealed per listing.
- ✓ Verify all metallic raceways, J-boxes, supports and modules are properly labeled and grounded in accordance with product listings. (2013 CEC Art 690.43)
- ✓ Verify all exposed wiring is listed Sunlight Resistant. (2013 CEC Art 690.31)
- ✓ Verify all module interconnection connectors require a tool for opening. (2013 CEC Art 690.33)

### DC Disconnect

- ✓ Verify proper location of DC disconnect and that it shall be readily accessible - within sight of inverter - and properly listed for 600 volt DC power. (2013 CEC Art 690.14)
- ✓ If DC wiring is run through the building, a DC disconnect shall be installed prior to the conductors entering the building or the conductors shall be installed in metallic raceways or metallic enclosures from the point of entrance to the DC disconnect. All J-boxes shall be labeled. (2013 CEC Arts 690.31 (E), 690.14 (C)(1))
- ✓ Verify proper and permanent labeling with the following information (CEC Art 690.17):

  **PHOTOVOLTAIC DC DISCONNECT**

  and

  **WARNING**
  **ELECTRIC SHOCK HAZARD**
  **DO NOT TOUCH TERMINALS**
  **TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION**
- ✓ The DC disconnect shall also be properly and permanently labeled with the following Installed System Information: (2013 CEC Art 690.53)
  (1) Rated maximum power-point current
  (2) Rated maximum power-point voltage
  (3) Maximum system voltage
  (4) Short-circuit current
- ✓ Verify labeling of wiring. (CEC Art 690.4)
- ✓ All conduits shall be run as close as possible to the ridges, hips, valleys or outside walls. (2013 CRC 331.3)
- ✓ Verify if DC circuits are more than 80 volts. Arc-fault protection shall be required. (2013 CEC Art 690.11)

### AC Point of Connection

- ✓ The breaker must be secured in place and not be equipped with line/load connection. (2013 CEC Art 690.10 (E))

Note: Roof-top micro-inverter systems have no DC disconnect switches. AC disconnect shall be installed on the roof or at the utility panel and be capable of being locked OFF. Installed system information shall be installed on Utility Service Panel.

## Questions

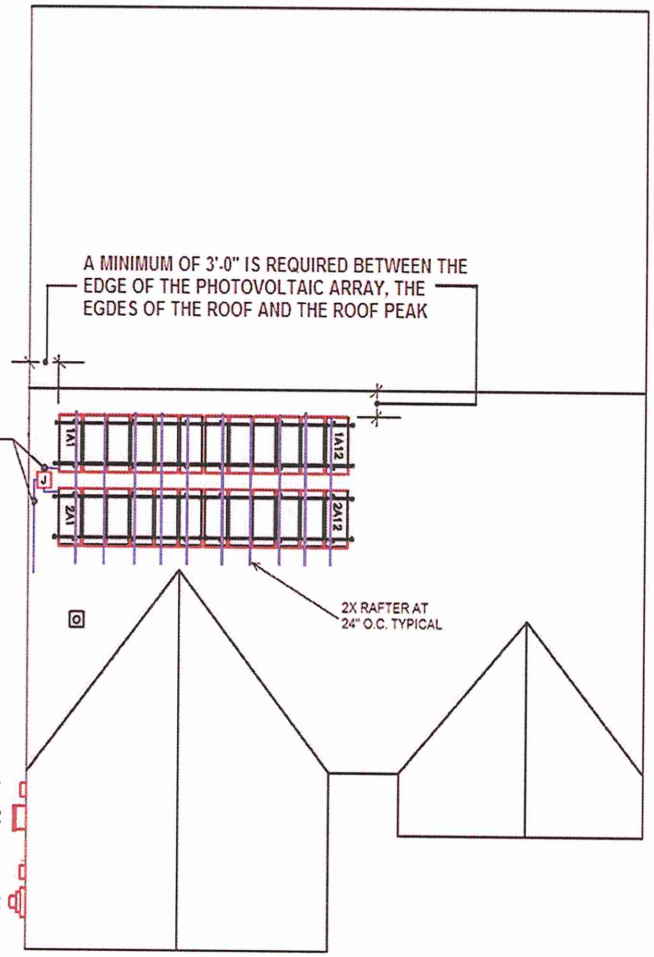
Contact the **Building & Safety Division** at **(925) 833-6620** for fee or submittal inquiries.

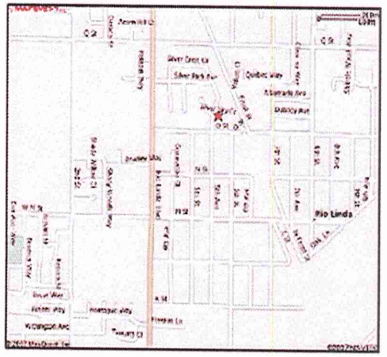
## MOUNTING NOTES

1. PANELS MOUNTED ON ALUMINUM RACKING
2. PV ARRAY MOUNTES TO ROOF STRUCTURE WITH 5/16" LAGS EMBEDDED 2.5" INTO RAFTERS OR SEE NOTE #5 BELOW
3. PV PANELS ARE ANCHOR AT 48" O.C.; TRUSS/ RAFTERS ARE AT 24" O.C. OR SEE NOTE #5 BELOW
4. WEIGHT OF PV MODULES AND ASSEMBLY SHALL BE LESS THAN 5 LBS PER SQUARE FOOT
5. ALL INSTALLATION MUST COMPLY WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS

## ARRAY CONDUIT & WIRING ARRANGEMENT

SEE STANDARD ELECTRICAL DIAGRAM ON NEXT DRAWINGS FOR ARRAY CONDUIT AND WIRING ARRANGEMENT



SITE MAP

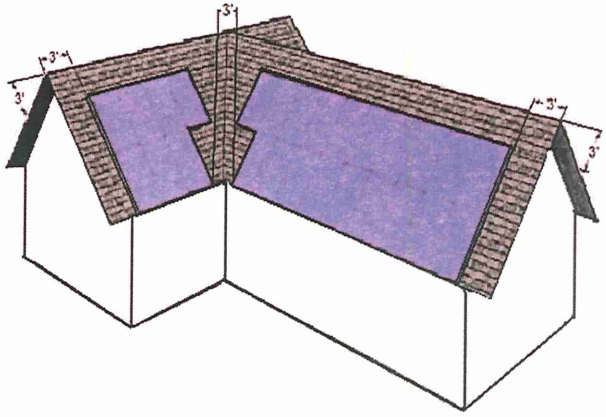
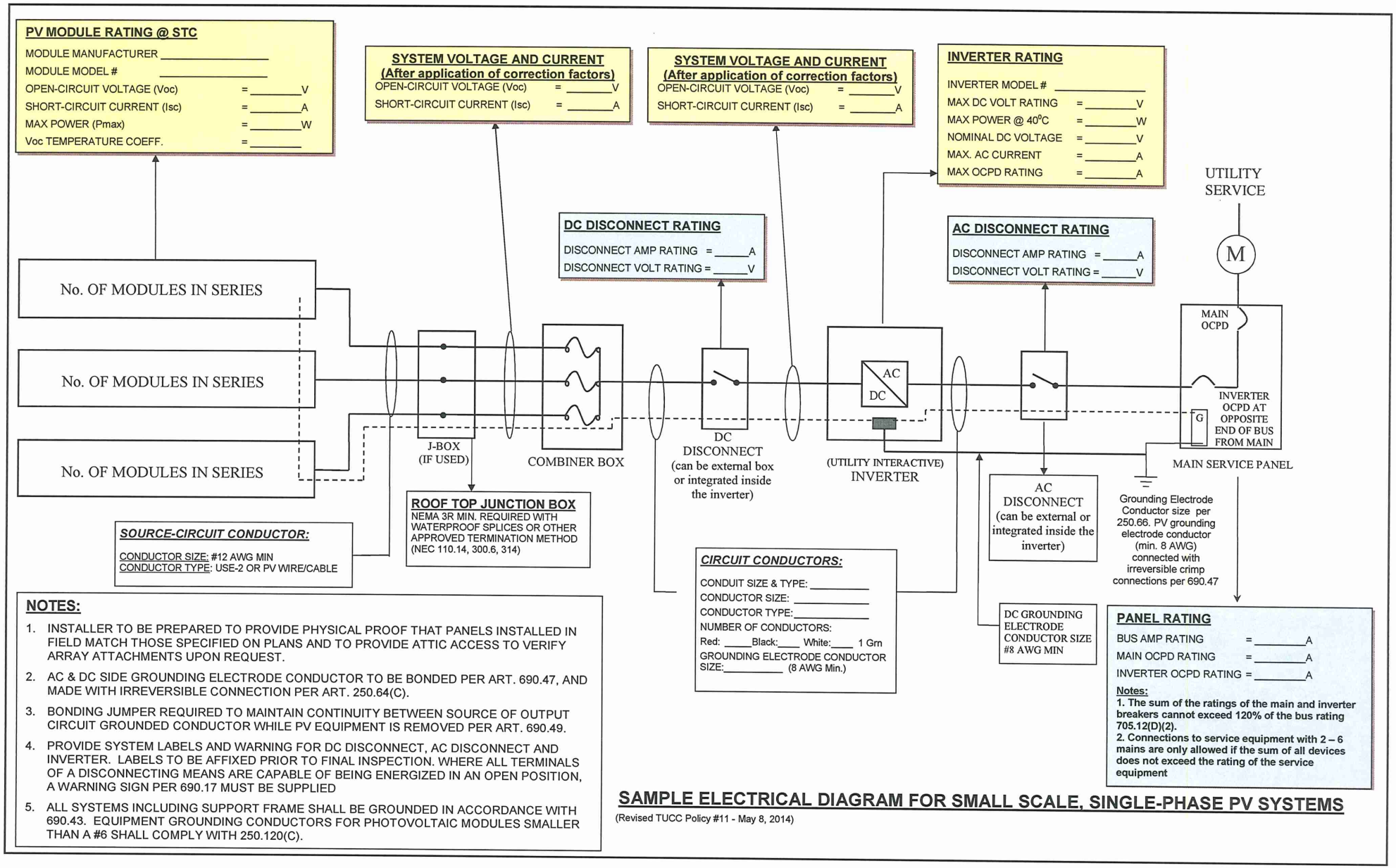



DIAGRAM: REQUIRED CLEAR ACCESS PATHWAYS

# PV ARRAY LAYOUT & WIRING PLAN


| CUSTOMER NAME | | | |
|---|---|---|---|
| ADDRESS | | | |
| DRAWN BY | | CHECK BY | |
| SCALE | NTS | DATE DRAWN | |
| COMPANY LOGO | COMPANY NAME ADDRESS | | |




**NOTES:**

1. INSTALLER TO BE PREPARED TO PROVIDE PHYSICAL PROOF THAT PANELS INSTALLED IN FIELD MATCH THOSE SPECIFIED ON PLANS AND TO PROVIDE ATTIC ACCESS TO VERIFY ARRAY ATTACHMENTS UPON REQUEST.
2. AC & DC SIDE GROUNDING ELECTRODE CONDUCTOR TO BE BONDED PER ART. 690.47, AND MADE WITH IRREVERSIBLE CONNECTION PER ART. 250.64(C).
3. BONDING JUMPER REQUIRED TO MAINTAIN CONTINUITY BETWEEN SOURCE OF OUTPUT CIRCUIT GROUNDED CONDUCTOR WHILE PV EQUIPMENT IS REMOVED PER ART. 690.49.
4. PROVIDE SYSTEM LABELS AND WARNING FOR DC DISCONNECT, AC DISCONNECT AND INVERTER. LABELS TO BE AFFIXED PRIOR TO FINAL INSPECTION. WHERE ALL TERMINALS OF A DISCONNECTING MEANS ARE CAPABLE OF BEING ENERGIZED IN AN OPEN POSITION, A WARNING SIGN PER 690.17 MUST BE SUPPLIED
5. ALL SYSTEMS INCLUDING SUPPORT FRAME SHALL BE GROUNDED IN ACCORDANCE WITH 690.43. EQUIPMENT GROUNDING CONDUCTORS FOR PHOTOVOLTAIC MODULES SMALLER THAN A #6 SHALL COMPLY WITH 250.120(C).

## SAMPLE ELECTRICAL DIAGRAM FOR SMALL SCALE, SINGLE-PHASE PV SYSTEMS

(Revised TUCC Policy #11 - May 8, 2014)